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August 19, 1997

Mr. Mark Austin
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PROJECT: EPA ARCS Contract 68-W9-0024
Work Assignment 064-2P2J
Pulverizing Services Site
Moorestown, New Jersey

DOCUMENT NO. 7720-064-EP-CNSY

SUBJECT: Addendum to the Final Endangerment Assessment
Document Control No.: 7720-064-RA-CNSZ

Dear Mr. Austin:

CDM Federal Programs Corporation (CDM Federal) is pleased to submit the attached Addendum to the Final Endangerment Assessment for the Pulverizing Services Site in Moorestown, New Jersey as partial fulfillment of the reporting requirements of ARCS Work Assignment 064. This Addendum was prepared at Mr. Osolin's request to qualitatively address the impacts to site risk that would be caused by the use of updated toxicity values, which have been revised since CDM Federal submitted the Final Endangerment Assessment report to EPA in February, 1996.

If you have any questions concerning this submittal, please contact me at (212) 785-9123.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION

Robert D. Goltz

Robert D. Goltz, P.E.
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cc: J. Osolin, EPA
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Document Control

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ADDENDUM TO THE
FINAL ENDANGERMENT ASSESSMENT

PULVERIZING SERVICES SITE
MOORESTOWN, NEW JERSEY

August 19, 1997

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Addendum to the Final Endangerment Assessment

Pulverizing Services Site
Moorestown, New Jersey

August 1997

CDM Federal Programs Corporation (CDM Federal) has prepared this addendum to the February 2, 1996 Final Endangerment Assessment for the Pulverizing Services Site in Moorestown, New Jersey. The addendum was prepared, at EPA request, to address several specific comments that EPA received from ChemRisk, consultants to PPG Industries, on the Final Endangerment Assessment. Specifically, this addendum qualitatively addresses the changes to calculated site risk levels that would result if these levels were updated to reflect recent revisions to the carcinogenic slope factor for arsenic and the reference dose for manganese that were used in the 1996 report. In addition, this addendum addresses the impact of regrouping the data from one misclassified sample location with the data from its proper area of the site. Also, this addendum revises the recommendation made in the qualitative ecological risk assessment; no further study of ecological risk is recommended.

Change in the Slope Factor for Arsenic

In the Final Endangerment Assessment for the Pulverizing Site, CDM Federal used an arsenic oral slope factor of $1.75 \text{ (mg/kg/day)}^{-1}$ in the calculation of carcinogenic risks. Using this slope factor, arsenic contributed to risks exceeding EPA's target risk range for groundwater pathways only. Using the slope factor of $1.75 \text{ (mg/kg/day)}^{-1}$ for soils, surface water, and sediment, all carcinogenic risks were within or below the target risk range.

In July, 1995, the carcinogenicity of arsenic was revised in EPA's Integrated Risk Information System (IRIS) database, resulting in a new oral slope factor of $1.5 \text{ (mg/kg/day)}^{-1}$. However, the Draft Endangerment Assessment (August, 1995), which had been prepared using the earlier slope factor, was not updated, as it would have involved significant revision to change all of the spreadsheets and tables in the document, yet this revision would not change the overall risks.

For this addendum, CDM Federal recalculated the carcinogenic risks for arsenic using the oral slope factor of $1.5 \text{ (mg/kg/day)}^{-1}$. When the cancer slope factor for arsenic is changed from $1.75 \text{ (mg/kg/day)}^{-1}$ to $1.5 \text{ (mg/kg/day)}^{-1}$, the groundwater risks do not change significantly (i.e., decrease slightly) and the groundwater risks still exceed the upper boundary of EPA's target risk range. The change in the arsenic slope factor for soil, surface water, and sediment results in a slight decrease in risks that were already within or below EPA's target risk range.

A summary of the recalculated risks is presented in Table 1. Only those pathways for which the risk changed are presented. The risks for other pathways were not affected by the change in the slope factor, either because arsenic was not a contaminant of concern or because it did not significantly

contribute to the pathway risk. For example, even though arsenic was a contaminant of concern for the surface water drainage pathways, the individual risk contributed by arsenic using either slope factor, is on the order of 10^{-10} , several orders of magnitude lower than the risks contributed by other contaminants. Thus, the change in the overall pathway risk was unaffected by the change in slope factor for arsenic.

Change in the Reference Dose for Manganese

At the time the Draft Endangerment Assessment for the Pulverizing Site was completed, the accepted IRIS value for the oral reference dose (RfD) for manganese in water was $5E-03$ (mg/kg/day), and this value was used in the risk assessment. Using this RfD, manganese did not contribute to any hazard indices exceeding 1.0.

In 1996, the RfD for manganese was revised to $2.3E-02$ (mg/kg/day). This value is derived from a dietary RfD of 0.14 mg/kg/day adjusted for 50% intake of manganese from the diet and a safety factor of 3. Therefore, for this addendum, CDM Federal recalculated noncarcinogenic hazard indices using the new RfD of $2.3E-02$ (mg/kg/day). The resultant hazard indices are lower than those originally calculated.

A summary of the recalculated hazard indices are presented in Table 2. Only those pathways for which the hazard index changed are presented. The hazard indices for other pathways were not affected by the change in the reference dose, because either manganese was not a contaminant of concern or it did not significantly contribute to the pathway hazard index.

Total and Hexavalent Chromium

PPG Industries and ChemRisk questioned why the risks from chromium were calculated using a standard 6:1 concentration ratio of chromium +3 (trivalent) to chromium +6 (hexavalent) concentrations instead of using a site-specific ratio based on analytical laboratory results for chromium +6.

The sample data provided for the Pulverizing Site Endangerment Assessment included both total chromium and hexavalent chromium for select samples. As stated on Page 104 of the text, hexavalent chromium sample results, when available, were used in risk calculations; otherwise the standard ratio of 6:1 chromium +3 to chromium +6 was applied to total chromium concentrations. The use of the ratio is in accordance with IRIS (on-line June 1995) and is based on scientific studies. The information contained in IRIS represents an EPA scientific consensus. The use of the ratio is conservative and is the best approach for the Pulverizing data set for the following reasons.

- For a majority of samples in which total chromium was detected, hexavalent chromium was not detected. In addition, in a number of subsurface soil samples, hexavalent chromium was not analyzed. Also, the hexavalent chromium results in a number of surface water and sediment samples were rejected. Therefore, a site-specific ratio of total chromium to hexavalent chromium could not be calculated for many samples in the data set.

- In samples where both total chromium and hexavalent chromium were detected, the ratio of total chromium to hexavalent chromium ranged from 4:1 to 20:1. Therefore, subtracting the hexavalent chromium result from the total chromium result to determine the trivalent chromium and then determining an average ratio would likely result in a higher ratio than 6:1, and might add to the overall uncertainty of the chromium evaluation.
- The use of the default ratio (6:1) did not result in any carcinogenic risks or hazard indices exceeding EPA target levels, since chromium was only selected as a contaminant of concern for surface water (drainage from Area A - B) and was not a risk driver in any exposure pathways.

Surface Soil Data Groupings for Areas A and C and DDT Risks

In the Endangerment Assessment data groupings for surface soils, sample SB-31B was grouped with data from Area C, where it showed the maximum detected concentration of DDT. Subsequent to submitting the Final Endangerment Assessment, CDM Federal was informed that this sample should have been grouped with samples from Area A, an area where other samples contained significantly more DDT than SB-31B.

For this addendum, CDM Federal regrouped the sample to qualitatively assess whether the calculated risks would change significantly in either area. This reclassification did not have a significant impact on the DDT risks for surface soils in either Area A or Area C.

Maximum Concentration

The regrouping of sample SB-31B from Area C to Area A results in a reduction in the maximum concentration for DDT in Area C from 3.8 mg/kg to 2.2 mg/kg and no change in the maximum concentration of DDT in Area A.

Selection of Contaminants of Concern

CDM Federal revised the toxicity screening spreadsheets for Area C to see if removing sample SB-31B from the data set would change the selection of contaminants of concern (COCs) for Area C. A decrease in the maximum concentration of DDT in surface soils in Area C from 3.8 mg/kg to 2.2 mg/kg does not result in a change in the selection of COCs for Area C. This is indicated in the attached revised Table 2-14. Although the contribution to total risk for matrix (percent) is slightly changed for DDT (lower) and other detected compounds (higher), the chemicals contributing greater than 1%, and therefore selected as COCs, are unchanged.

The inclusion of SB-31B to the Area A data set does not change the maximum concentration for DDT. Therefore, the concentration-toxicity screen and selection of COCs are unchanged.

Risks

The change in the maximum concentration (also the EPC) of DDT in Area C from 3.8 mg/kg to 2.2 mg/kg results in the following changes in DDT risks and hazard indices:

<u>Risks</u>	<u>Previous</u>	<u>New</u>
Children (12-17 years old)	4.3E-08	2.4E-08
<u>Hazard Indices</u>		
Children (12-17 years old)	3.0E-03	1.7E-03

Both the previous and new risk levels and hazard indices are below EPA's target risk range and action levels.

Since the maximum concentration (also the exposure point concentration) did not change for Area A, there is no impact on DDT risks and hazard indices.

Recommendation from Qualitative Ecological Risk Assessment

Section 9.0 of the Final Endangerment Assessment presented the results of a qualitative ecological risk assessment for the Pulverizing Site. Based on the presence of chemicals of concern for their potential toxicity to ecological receptors (primarily pesticides and metals) in site soils, surface water and sediment, and the existence of potential exposure pathways for terrestrial and aquatic ecological receptors, the assessment concluded by recommending that a quantitative ecological risk assessment be conducted to determine the extent of risks posed to the environment due to site contamination.

However, since the submittal of the Final Endangerment Assessment, EPA has determined that a quantitative ecological risk assessment is not warranted. The current and future use of the site is industrial/commercial, and as such, the site is not considered to provide a critical habitat to wildlife. The recommendations have therefore been changed to no further study recommended. A revised page to the Final Endangerment Assessment is attached.

Revised Summary to
Section 9.0
Ecological Risk Assessment

(p. 261 of Final Endangerment Assessment, February 1996)

In conclusion, this evaluation of the conditions at the Pulverizing Services site showed that potential exposure pathways to ecological receptors exist in a variety of media. However, a quantitative ecological risk assessment is not recommended. The current and future use of the site is industrial/commercial, and as such, the U.S. Environmental Protection Agency does not consider the site as a critical habitat to wildlife. It is believed that the site's planned remedial action, which is designed to achieve the industrial level cleanup goals specified in the baseline human health risk assessment, will be sufficient to address the most significant chemical contaminant risks to potential ecological receptors.

Table 1

**Pulverizing Services Site
Revised Carcinogenic Risks for Arsenic**

Media	Receptor Population	Exposure Route	Arsenic Slope Factor of 1.75 Arsenic Risk	Pathway Risk	Arsenic Slope Factor of 1.5 Arsenic Risk	Pathway Risk	Chemicals Contributing the Greatest Amount to Risk	
SURFACE SOIL								
Area B	Area Residents/ Trespassers Children (12-17 years old)	Ingestion	8.6E-07	4.9E-06	7.4E-07	4.8E-06	—	
Area C	Area Residents/ Trespassers Children	Ingestion	1.2E-06	1.3E-06	1.0E-06	1.1E-06	—	
Area B	Residents: Adults	Ingestion	1.2E-05	6.9E-05	1.1E-05	6.8E-05	—	
	Children (0-6 years old)	Ingestion	2.8E-05	1.6E-04	2.4E-05	1.6E-04	No chemicals exceed upper-bound of the target risk range	
Area B	Site Workers/ Employees	Ingestion	4.5E-06	2.6E-05	3.9E-06	2.5E-05		—
Area C	Site Workers/ Employees	Ingestion	6.2E-06	7.0E-06	5.4E-06	6.2E-06		—
SUBSURFACE SOIL								
Area A	Construction Workers	Ingestion	4.5E-07	4.0E-06	3.9E-07	3.9E-06	—	
Area B	Construction Workers	Ingestion	1.1E-07	8.8E-06	9.4E-08	8.8E-06	—	

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Table 1

**Pulverizing Services Site
Revised Carcinogenic Risks for Arsenic**

Media	Receptor Population	Exposure Route	Arsenic Slope Factor of 1.75 Arsenic Risk	Pathway Risk	Arsenic Slope Factor of 1.5 Arsenic Risk	Pathway Risk	Chemicals Contributing the Greatest Amount to Risk
GROUNDWATER (Saturated Surficial Aquifer) (Site-wide)	Residents: Adults	Ingestion Dermal Contact	1.3E-02 8.6E-05	1.7E-02 1.5E-04	1.1E-02 7.4E-05	1.6E-02 1.4E-04	alpha-BHC, Dieldrin, Lindane, Arsenic No chemicals exceed upper-bound of the target risk range
	Children (0-6 years old)	Ingestion	7.4E-03	1.0E-02	6.3E-03	9.1E-03	alpha-BHC, Dieldrin, Lindane, Arsenic
	Site Workers/ Employees	Ingestion	4.7E-03	6.5E-03	4.1E-03	5.8E-03	alpha-BHC, Lindane, Arsenic
SURFACE WATER							
Drainage from Area A through Area B	Area Residents/ Trespassers Children (12-17 years old)	Dermal Contact	1.3E-07	4.3E-07	1.1E-07	4.0E-07	—
Drainage from Area A through Area B	Residents: Adults	Dermal Contact	2.4E-07	7.8E-07	2.1E-07	7.5E-07	—
	Children (12-17 years old)	Dermal Contact	1.3E-07	4.3E-07	1.1E-07	4.2E-07	—

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Table 2
Pulverizing Services Site
Revised Hazard Indices for Manganese

Media	Receptor Population	Exposure Route	Manganese RfD of 5E-03 Manganese HI	Pathway HI	Manganese RfD of 2.3E-02 Manganese HI	Pathway HI	Chemicals Contributing the Greatest Amount to Hazard Index Values
SURFACE SOIL							
Area B	Area Residents/ Trespassers Children (12-17 years old)	Ingestion	1.2E-02	2.5E-01	2.7E-03	2.4E-01	—
Area C	Area Residents/ Trespassers Children	Ingestion	2.2E-02	5.4E-02	4.8E-03	3.5E-02*	—
Area B	Residents: Adults	Ingestion	4.4E-02	8.8E-01	9.6E-03	8.5E-01	—
	Children (0-6 years old)	Ingestion	4.1E-01	8.2E+00	8.7E-03	7.8E+00	4,4'-DDT
Area B	Site Workers/ Employees	Ingestion	1.6E-02	3.1E-01	3.4E-03	3.0E-01	—
Area C	Site Workers/ Employees	Ingestion	2.8E-02	6.8E-02	6.1E-03	4.6E-02	—
SUBSURFACE SOIL							
Area A	Construction Workers	Ingestion	2.9E-02	1.3E+00	6.5E-03	1.3E+00	—

* Also includes a reduction in the HI for DDT from 3.0E-03 to 1.7E-03.

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TABLE 2-14

PULVERIZING SERVICES SITE
CHEMICAL CONCENTRATION - TOXICITY SCREEN
SURFACE SOIL - AREA C

CARCINOGENS:

CHEMICAL	Chemical of Potential Concern (Contributes >1%)	Maximum Detected Concentration (mg/kg)	Slope Factor (mg/kg-day) ⁻¹	Risk Factor (unitless)	Contribution to Total Risk for Matrix (Percent)
4,4'-DDE	no	1.20E+00	3.4E-01	4.08E-01	0.92%
4,4'-DDD	no	9.60E-02	2.4E-01	2.30E-02	0.05%
4,4'-DDT	YES	2.20E+00	3.4E-01	7.48E-01	1.68%
Chlorobenzilate (TIC)	no	2.40E-01	2.7E-01	6.48E-02	0.15%
Arsenic	YES	2.27E+01	1.75E+00	3.97E+01	89.21%
Beryllium	YES	3.40E-01	4.3E+00	1.46E+00	3.28%
OCDD *	YES	1.40E-05	1.5E+05	2.10E+00	4.72%
TOTAL RISK FACTOR =				4.45E+01	100%

* The 2,3,7,8-TCDD toxicity equivalency factor was used to evaluate the risk associated with OCDD.

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TABLE 2-14

PULVERIZING SERVICES SITE
CHEMICAL CONCENTRATION - TOXICITY SCREEN
SURFACE SOIL - AREA C

NONCARCINOGENS:

CHEMICAL	Chemical of Potential Concern (Contributes >1%)	Maximum Detected Concentration (mg/kg)	Reference Dose (mg/kg-day)	Risk Factor (unitless)	Contribution to Total Risk for Matrix (Percent)
Di-n-butylphthalate	no	2.21E+00	1.0E-01	2.21E+01	0.02%
Chlorobenzilate (TIC)	no	2.40E-01	2.0E-02	1.20E+01	0.01%
4,4'-DDT	YES	2.20E+00	5.0E-04	4.40E+03	3.03%
Arsenic	YES	2.27E+01	3.0E-04	7.57E+04	52.04%
Barium	no	3.65E+01	7.0E-02	5.21E+02	0.36%
Beryllium	no	3.40E-01	5.0E-03	6.80E+01	0.05%
Chromium III	no	1.69E+01	1.0E+00	1.69E+01	0.01%
Chromium VI	no	1.40E+00	5.0E-03	2.80E+02	0.19%
Manganese	YES	2.85E+02	5.0E-03	5.70E+04	39.20%
Nickel	no	8.30E+00	2.0E-02	4.15E+02	0.29%
Selenium	no	9.90E-01	5.0E-03	1.98E+02	0.14%
Vanadium	YES	4.64E+01	7.0E-03	6.63E+03	4.56%
Zinc	no	5.13E+01	3.0E-01	1.71E+02	0.12%
TOTAL RISK FACTOR =				1.45E+05	100%